

Assess the potential
of three sources of
renewable energy as
alternatives to usin...



After experiencing the replacement of manual and animal labour by steam engines in the Industrial Revolution, cheap fossil fuels then became the main source of energy. However, faced with the notable increase demand for energy, fossil fuel, as a non-renewable resource becomes scarcer and more expensive nowadays. To solve this problem, the world needs to replace fossil fuels with other sources of energy which are relatively low-cost and more secure. Renewable energy is such a potential energy.

This essay will give an outline of three sources of renewable energy to be used in developing nations, which are solar energy, wind power and biomass. First, it will give a definition of fossil fuel and renewable energy, then it will move to analyse these three sources, evaluating them in three criteria: technology, cost and reliability to see whether they have great potential helping the developing world moving upwards in the future development. Firstly, it is important to make clear the definition of fossil fuels and renewable energy.

Fossil fuels can be defined as solid, liquid, or gaseous fuels formed in the ground after millions of years by chemical and physical changes in plants and animal residues under high temperature and pressure. According to Franchi (2005: 72), “renewable energy is energy obtained from sources at a rate that is less than or equal to the rate at which the source is replenished”. Compared with conventional energy, renewable energy has an impressive long-term potential. Undoubtedly there are environmental concerns with the usage of non-renewable energy.

Massive combustion of fossil fuels leads to serious air pollution and global warming, thus posing major health risks coupled with the quick and wide migration of diseases. However, renewable energy offers clean sources that seem much friendlier to the environment. Furthermore, it is widely agreed that renewable energy is more likely sustainable to meet demand in future development other than fossil fuels. Another advantage for developing nations using renewable energy is to help local economic develop, since investments are taking place and facilities are built and maintained, bringing employment a boost.

Regions that still require fossil fuel to provide electricity and heating may spend a great deal of money on imported fuels. Therefore, renewable energy shows a big potentiality in future energy supply. To start with, as Volker (2005) mentioned, solar energy is an inexhaustible supply of energy. Yet there is far less an agreement about this. Franchi (2005) claims that energy from the Sun is terminate since the Sun is measured to remain its life for millions of years. Human now consider solar energy as a renewable energy because it should persist being available for many generations of people.

Though it is generally accepted that solar power might have a great potential in the future energy supply, it is important to bear in mind that for some developing countries, this may call for high technology and expenditure which they cannot afford. Great efforts have been made to reduce the cost of solar thermal plants (Middleton, 2003; Seitz, 2002), however, solar cells are still relatively expensive, thus result in the limitation of wider use, especially in the developing world (Seitz, 2002).

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Solar energy has already shown its promise with a massive resource and few adverse environmental impacts (Aringhoff et al, 2005; Middleton, 2003; Seitz, 2002). Though objections might occur when the amount of sunlight arriving at the earth is not constant and there is not enough energy delivered by the sun at any one place at any one time, making the energy collection at a useful rate a rather difficult process, according to the Energy Information Administration (2006). The use of solar energy also has great dependence on location, time, and weather condition.

Nevertheless, its potential to be used in developing countries is still promising since it is reported that the countries in the Middle East are included in the most promising regions, in terms of governmental targets or potentials to the scenario (Aringhoff et al, 2005). Other developing nations such as Mexico, India, Egypt, etc are now making great efforts. Admittedly, it will be worth an investment if the expense continues to fall down to an acceptable extent, as predicted (Aringhoff et al, 2005; Seitz, 2002; and Middleton, 2003).

As another renewable energy widely used, wind power, which is now mainly used for generating electricity today, has been used for thousands of years powering human activities. Unlike solar energy previously mentioned, wind is caused by the uneven heating of the earth's surface by the sun so that wind energy is an indirect form of solar energy (Volker, 2005). Wind is called a renewable energy source owing to the infinite sun shines. However, one crucial part of establishing a wind power system is high technology, which is now the main defect in the developing world.

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Even in some developed countries such as Denmark, lack of expert engineers in the wind industry is noticeable. It is convincingly argued that there is quite an engineering challenge especially for the less-developed nations to design an efficient wind turbine harnessing energy and turning it into electricity. In addition, it seems rather a challenge to offer opportunities for technology transfer, training and practical experience for the industry and potential wind energy supporting industries and organisations for the current developing world.

Contributions made by wind energy seem mainly to be the reduction of environmental impacts. It is noted that using wind power is a substantial contribution towards the considerable carbon dioxide (CO₂) emission (Wind power and the environment- benefits and challenges 2006). This observation is also supported by an earlier study (Volker, 2005) which found that wind energy is one of the most important alternatives to put a stop to global warming. Therefore, the use of wind power can furnish a large amount of energy without polluting the environment.

Whilst the benefits of switching to wind power are relatively straightforward to assess, the cost of it is more complex and controversial. In order to generate a mass of energy, larger areas with a wealth of wind are needed to build wind farms and the wind turbines are growing larger and taller nowadays. In addition, environmental issues arise: how the turbines appear in a landscape, the sound they make and their effect on birds and other wildlife (Middleton, 2003).

Similar evidence can be found to support this view by Volker (2005) and Wind power and the environment- benefits and challenges (2006, p31-33). It seems that wind power has already had an enormous promise in most of the developed countries, however, the fact is, technology problems still exist to increase the burden of a developing country to put the use of wind energy to a wider extent. Unlike these two sorts of sustainable energy mentioned above, biofuel seems to have a larger foreground.

Seitz (2002), Middleton (2003), and Hunt et al (2006) claim that unprocessed biofuels, such as wood, animal dung, agriculture and forestry residues, were once heavily used in more-developed countries until the cheap fossil fuel took its position, are now still widely used in less-developed nations, showing an enormous promise. It is also maintained by Seitz (2002) that in some developing nations, for instance, China and India, the demand of fuels for villages are in forms of methane gas generated from crop, animal and human wastes.

Other developing countries such as Brazil make full use of residues from sugar- canes to create alcohol for fuel for automobiles. Biomass has been a principle fuel in developing countries partly because it needs low technology to operate. According to Hunt et al (2006), many energy experts believe that the development of biofuels may contribute significantly to the displacement of fossil fuels over several decades, whereas an opposite perspective is held by some famers, energy companies, and consumers, who think biomass fuels are unpractical or as far in the future development.

This, however, does not mean that protests will not appear. Coalitions of political support among some groups, for example, oil executives who want to manage the business in the long run, farmers who are looking for wider markets, will be achieved if active communication is established (Hunt et al, 2006). This point of view is also supported by Middleton (2003). However, dramatically expanding populations in the developing world give biofuel consumption a boost, coupled with unsustainably use of energy, shortages of firewood now exist in wide areas of Africa, Asia, and Latin America (Seitz, 2002).

If biomass fuel is sustainably managed as Middleton (2003) suggested, great benefits will be provided. Upgrade on environment quality will be achieved considerably, for instance, zero net emission of CO₂ to the atmosphere on account of the amount released will be absorbed by plants. Biological energy then cycles with the photosynthetic fixation of CO₂ into biomass and is followed by the conversion of biomass via various microbial processes to fuels.

Accordingly, it is important to identify more accurately suitable plants and make proper decisions of where to grow them to make their full potential (Middleton, 2003). To sum up, the worldwide demand for energy will rise dramatically as the developing nations industrialize and urbanize along the lines followed in the developed countries. Furthermore, the bringing of high technologies to the less-developed countries apparently calls for significant use of energy. It is usually asserted that renewable energy will be more competitive and it might someday supersede fossil fuels.

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Indeed, it is convincingly to acknowledge that the recommendation of substituting solar and biomass energy for fossil fuels is worth a try in developing nations. In this case, wind power seems to have less opportunity in contrast to solar power and biofuels to achieve substantial status to be the current market leaders especially in the developing countries. Reference List: Aringhoff, R; Brakmann, G; Geyer, M & Teske, S. (2005), Concentrated Solar Thermal Power- Now! Greenpeace Press. Eitzen, D. S & Zinn, M. B (2004), Social Problems, 9th edn, Pearson Education.

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